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REMARKS

Drawings

The Examiner stated that the drawings are objected to under 37 CFR 1.83(a) as not showing every feature of the invention as specified in the claims.

Regarding the specified feature for claims 14 and 19, the Examiner states:

“...the flat bottom surface of the heat sink (sic) that extends past the IC by a second distance, the second distance being less than the first distance, as required in claims 14 and 19 must be shown or the features canceled from the claims.”

It is respectfully submitted that it would be obvious to those having ordinary skill in the art that the heat sink 16 has an inherent flat bottom surface as shown in FIG. 2. Also, it is shown in the same FIG. that the heat sink extends past the IC by a first distance. Referring to FIG. 3, it may be seen that the heat sink extends past the IC by a second distance, which is less than the first distance. It should be noted that claim 14 claims the second distance to be perpendicular to the first distance, although this is not a required limitation. Thus, the drawings show every feature of the invention and is in compliance with 37 CFR 1.83(a).

Regarding the specified feature for claim 21, the Examiner states:

“The structure of geometric dimensions that are equal to the dimension of the substrate but whereby said structure does not have heat dissipating characteristics of a typical heatsink, as required in claim 21 must be shown or the feature canceled from the claim.”

Claim 21 has been amended to delete the language starting with “but whereby”.

Regarding the specified feature for claim 16, the Examiner states:

“The four planar spacers that separate the heatsink from the substrate by a measurable amount, as required in claim 16 must be shown or the feature canceled from the claim.”

It is respectfully submitted that it would be obvious to those having ordinary skill in the art that the spacers 14 of FIG. 1 would be used in the structure having the same numbered substrate 12 and heatsink 16 shown in FIG. 2. The “four” is a limitation on the spacers shown in FIG. 1.

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Regarding the specified feature for claim 17, the Examiner states:

"The third distance that is greater than two of the first distances, as required in claim 17 must be shown or the feature canceled from the claim."

It is respectfully submitted that it would be obvious to those having ordinary skill in the art that the third distance is shown in FIG. 4b where the distance between the ICs is greater than the distance that a heat sink extends past its IC.

Based on the above, it is respectfully submitted that the drawings are in compliance with 37 CFR §1.83(a) as showing every feature of the invention as specified in the claims.

Specification

The disclosure is objected to because of informalities in the Description of the Preferred Embodiments section, page 5, about line 18.

Applicants have corrected the grammar in the paragraph which begins on page 5, line 13, to change "while a upper" to --while an upper-- and "device make contact" to --device makes contact--.

Applicants have also updated the Cross-Reference to Related Application(s) section to include the patent number, 6,660,565 B1, of the parent application.

Claim Rejections - 35 USC §112

The Examiner indicated that claims 14, 17, 18, 19 and 21 have been rejected under 35 U.S.C. §112, first paragraph, for failing to comply with the written description requirement. Further, the claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that at the time the application was filed, the inventor had possession of the claimed invention.

Regarding claim 14, the Examiner states:

"Regarding claim 14, the requirement that the flat bottom of the heat sink (sic) extends past the IC by a second distance, perpendicular to the first distance and/or less than the first distance is not described in the specification."

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It is respectfully submitted that the written description of the flip-chip 30 being mounted inside the cavity 32, etc. in Specification page 5, lines 5-10, describes the distances as would be obvious to those having ordinary skill in the art and, further, that the FIGs. 2 and 3 alone would be sufficient to enable one having ordinary skill in the art to understand the terms "first distance" and "second distance" under 35 USC §112, first paragraph, in accordance with the holding in *In re Wofensperger*, 302 F.2d 950, 133 USPQ 537 (CCPA 1962).

Regarding claim 17, the Examiner states:

"Regarding claim 17, the claim requires that the third distance be greater than two of the first distances. This limitation is not described in the specification."

It is respectfully submitted that the written description of multiple flip-chips encased in a mold in Specification page 6, lines 30-31, describes the third distance as would be obvious to those having ordinary skill in the art and, further, that the FIG. 4b alone would be sufficient to enable one having ordinary skill in the art to understand the term "third distance" under 35 USC §112, first paragraph, in accordance with the holding in *In re Wofensperger*, *supra*.

Regarding claim 18, the Examiner indicated this claim was rejected under 35 U.S.C. §112, first paragraph, but did not provide any further explanation. Thus, Applicant believes claim 18 is allowable.

Regarding claim 19, the Examiner states:

"Regarding claim 19, there is no disclosure of a flat bottom surface that extends past the IC by a second distance, wherein the second distance is less than the first distance."

It is respectfully submitted that the written description of the flip-chip 30 being mounted inside the cavity 32, etc., in Specification page 5, lines 5-10, describes the second and third distances as would be obvious to those having ordinary skill in the art and, further, that the FIG. 3 in conjunction with FIG. 2 would be sufficient to enable one having ordinary

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skill in the art to understand the terms "first distance" and "second distance" under 35 USC §112, first paragraph, in accordance with the holding in *In re Wofensperger, supra*.

Regarding claim 21, the Examiner states:

"Regarding claim 21, there is no disclosure of a structure that replaces the heatsink and does not have the heat dissipating characteristics of a typical heatsink."

Claim 21 has been amended to delete this limitation.

Based on the above, it is respectfully submitted that the claims are in compliance with 35 U.S.C. §112, first paragraph, because the claims comply with the written description requirement and contain subject matter which was described in the specification (which include the drawings) in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention.

The claims 14, 15, 17, 18 and 21 have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 14, the Examiner states:

"Regarding claim 14, the scope of the claim is not clear. The claim recites the limitation, "the flat bottom surface of said heat sink extends past said Integrated Circuit device by a second distance, the second distance is less than the first distance..." in lines 3 - 5 and lines 9 - 11. It is not clear if the second occurrence of this limitation is merely a repetition of the first or if this is a separate feature."

It is respectfully submitted that the second occurrence of the limitation is a narrowing of the first occurrence of the limitation in accordance with ordinary practice in patent law.

Regarding claim 15, the Examiner states:

"Claim 15 recites the limitations of "...an upper surface..." and "...a lower surface..." Claim 12 draws reference to a flat upper surface and a lower surface. It is not clear if the upper and lower surface mentioned in claim 15 are the same surfaces mentioned in claim 12, or if they are different surfaces."

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Claim 15 has been amended to clarify that the antecedent bases of these surfaces are in claim 12.

Regarding claim 17, the Examiner states:

"Claim 17 recites the limitation, "...the third distance greater than two of the first distances..." The scope of the claim is vague because it is not clear if the third distance is greater than the sum of the first distances or each of the two first distances individually."

It is respectfully submitted that both of the interpretations is incorrect. The former implies that the third distance is greater than the sum of "all" the first distances and the latter that the third distance is greater than "each" of the two first distances. The grammatical construction leaves no other reading than that the third distance is greater than one of the first distances plus another one of the first distances.

Regarding claim 18, the Examiner indicated this claim was rejected under 35 U.S.C. §112, second paragraph, but did not provide any further explanation. Thus, Applicant believes claim 18 is allowable.

Regarding claim 21, the Examiner states:

"Claim 21 requires that the heatsink be replaced with a structure that does not have heat dissipating characteristics of a typical heatsink. The scope of the claim is vague, since it is not known what structure can be used in place of the heatsink."

As indicated above, claim 21 has been amended to clarify the scope of the claim.

Based on the above, it is respectfully submitted that claims 14, 15, 17, 18 and 21 are allowable under 35 U.S.C. 112, second paragraph, as being definite by particularly pointing out and distinctly claiming the subject matter which Applicant regards as the invention.

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Claim Rejections - 35 USC §103

The Examiner has rejected claims 12, 13, 15, 16 and 20 under 35 U.S.C. §103(a) as being unpatentable over US Patent No. 6,720,650 to Miyazaki (hereinafter "Miyazaki") in view of admitted prior art (hereinafter "APA").

Regarding claim 12, The Examiner states:

"Regarding claim 12, Miyazaki teaches an IC package structure (Fig. 2E, for example), comprising:

...
a molding compound (4, 6) between the flat bottom surface of the heatsink and the flat upper surface of the substrate to fill only the first distance, said molding compound among the points of electrical contact to the IC device." [underlining for clarity]

Applicants respectfully disagree. Miyazaki in FIGs. 2A through 2E, 3A through 3G, and APA FIG. 1 respectively show a defined, separate stress relaxation resin, or insulating resin 4, and the underfill 21 among the points of electrical contact to the IC and thus, teach away from the claimed invention. Thus, it is respectfully submitted that claim 12 is unobvious under 35 U.S.C. §103(a) based on Miyazaki in view of APA because:

"[T]he prior art reference (or references when combined) must teach or suggest all the claim limitations." *In re Vaeck*, 947 F2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)

Regarding claims 13, 15, 16 and 20, these dependent claims respectively depend from independent claim 12 and are believed to be allowable since they contain all the limitations set forth in the independent claim from which they depend and claim additional unobvious combinations thereof.

The other reference cited by the Examiner showing the prior art has been considered and is not believed to disclose, teach, or suggest, either singularly or in combination, Applicants' invention as claimed.

Other

Claim 20 has been amended to insert --of-- between "The Integrated Circuit package structure" and "claim 12" in the preamble to correct a typographical error.

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Conclusion

In view of the above, it is submitted that the claims are in condition for allowance and reconsideration of the rejections is respectfully requested. Allowance of claims 12-21 at an early date is solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including any extension of time fees, to Deposit Account No. 50-0374 and please credit any excess fees to such deposit account.

Respectfully submitted,



Mikio Ishimaru
Registration No. 27,449

The Law Offices of Mikio Ishimaru
1110 Sunnyvale-Saratoga Rd., Suite A1
Sunnyvale, CA 94087
Telephone: (408) 738-0592
Fax: (408) 738-0881
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